

THE BREXIT-VOTE EXPLAINED

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Erasmus School of Economics

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Supervisor: Esmée Zwiers
Name: Eline Leermakers
Student number: 386420

Abstract

Brexit is a hotly debated topic in the literature. What consequences will the decision have for the United Kingdom and for the remaining countries of the European Union and how could Brexit have happened? This thesis will study the reasons of an individual person to vote Brexit.

The thesis researches the determinants of an individual Brexit-voter empirically. A multivariate logistic regression model is used to study the possible determinants, but first all variables are tested for significance using a univariate logistic regression. The significant variables are used in different multivariate logistic regressions. A final model with the most relevant factors is chosen. The results suggest that a low level of education, low household income, high political attention, neutral approval of the United Kingdom government, high Britishness, a negative attitude towards the immigration level and being supportive of the death penalty are determinants of a Brexit-voter.

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1. Introduction

At around 4:30 in the morning on the 24th of June 2016 the media began to announce that the British people had voted to leave the European Union. The final results showed that the pro-Brexit campaign had gathered 51.9% of the votes and a margin of more than one million voters (Menon & Salter, 2016). People all over the world were shocked. Just like Trump becoming the president of the United States of America later that year, no one had really expected it to happen. Half of the United Kingdom was sad, upset and disgusted by the decision made. The other half of the United Kingdom was overjoyed and thought it was the best decision ever made by the country. June 23, the day of the referendum, is considered Independence Day by some, whilst others consider it a black day in British history. Good or bad, June 23 is definitely going to be an important day in political history. Will it be the beginning of the end of the European Union or just a turning point? What consequences will the decision have for the United Kingdom and for the remaining countries of the European Union? Who is to blame for Brexit? Will other countries follow and why did we not see this coming?

Why did we not see Brexit coming? In 1957, France, West Germany, Belgium, Italy, Luxembourg and the Netherlands signed the Treaty of Paris and formed the European Economic Community. The United Kingdom was invited, but chose not to join. When the economic growth in the six EEC-member states had outgrown that of the United Kingdom, the United Kingdom saw the benefits of the community and wanted to join. At first, they were rejected, but in 1973 they made it into the community. Only to have a referendum on deciding whether to stay or leave the community two years later. In 1975, there was no Brexit, 67% of the country voted to stay (Menon & Salter, 2016). The relationship between the United Kingdom and the European Union has been difficult from the beginning. Tensions were at its top in 1984 when Prime Minister Margaret Thatcher renegotiated the financial contribution of the United Kingdom to the European Economic Community.

The Maastricht Treaty, signed in 1992, constituted the European Union. The European Union was designed to integrate Europe's nations both politically and economically, including common foreign policy and citizen rights, and a single currency (Phinnemore, 2016). The United Kingdom has chosen not to participate in the Euro, and only participate partly in Schengen (free movement of citizens across the European Union) (Glencross, 2015). The United Kingdom has always been sceptical towards the European Union and maybe its choice to leave should not have been such a surprise.

In 2007, the Lisbon Treaty was signed, increasing the power of Brussels. The power Brussels has over the member states is a disputed political topic in the United Kingdom. Supporters of Brexit claim that Brussels has too much power. The European Union charges billions of pounds in membership fees for little in return, and imposes too many rules on businesses. The United Kingdom should be able to make its own laws again, rather than following the rules of Brussels (Hunt & Wheeler, 2017).

Developments within Europe, such as the Eurozone crisis and the migrant crisis, made Euroscepticism in the United Kingdom grow. Brexit-supporters think that the United Kingdom should take back full control of its borders and reduce the number of immigrants (Hunt & Wheeler, 2017).

Support for the populist United Kingdom Independence Party, the political party most strongly supporting Brexit, increased over the last years. The United Kingdom Independence Party even won the European Parliament elections of 2014 (Sampson, 2017). The pressure Prime Minister David Cameron was put under by the United Kingdom Independence Party and his own increasingly Eurosceptical Conservative Party, left the Prime Minister with no other choice than giving the people what they wanted: an in/out referendum on membership of the European Union. Yet, the Prime Minister felt confident that the United Kingdom would not vote for a Brexit. Not only did all major parties in the Parliament favour remaining in the European Union, the business world also had great interest in not leaving the European Union (Hobolt, 2016). Even so, the country chose otherwise.

The United Kingdom is not the only country in which support for Eurosceptical, populist parties has grown over the last years. The popularity of the Eurosceptical parties of Marine Le Pen, Matteo Salvini, and Geert Wilders raises concerns for a Frexit, Itexit and Nexit. The Swiss People's Party, the Austrian Freedom Party, the Swedish Democrats, Greece's Golden Dawn and the Danish People Party also obtained considerable gains. Populism and Euroscepticism are more popular now than ever (Inglehart & Norris, 2016). The British voting to leave the European Union and Trump becoming president of the United States may only be the beginning.

The raise of populism and Euroscepticism has gone simultaneously, as these are two related concepts. Populist parties have a general resentment towards the authorities. They feel that the country should be led according to the will of the people, and not the elite. The parties favour a direct democracy in which the people can express their voice through referenda, and opinion polls. Another important feature is that populist parties want the country to be one united front that excludes people from other countries and cultures. The parties therefore support mono-culturalism over multiculturalism, national self-interest over international cooperation, and closed borders over free flow of people, ideas, labour and capital (Inglehart

& Norris, 2016). The dislike of the authorities and the nationalism coincide with being Eurosceptical.

Inglehart and Norris examine two possible theories explaining the rise of populism and thereby Euroscepticism. The first one is based on the trend towards greater income and wealth inequality in the Western world. Globalisation and technical enhancement are the main causes of this inequality. Civilians not benefitting from globalisation and technical enhancement are left-behind and therefore face greater economic insecurity. This insecurity makes them more likely to vote for populist parties, as the nationalistic, populist parties state that immigrants are responsible for stealing job opportunities and making use of too much of the country's public services. Long-term unemployed, households depending on social benefits, low-waged unskilled workers and single-parent families are therefore more likely to support populist parties (Inglehart & Norris, 2016).

The second theory explains the increase in votes for populist parties as being a reaction on progressive cultural change. The younger population carries different values from the older generation and with the younger generation gradually replacing their parents and grandparents in the population, a threat on traditional norms has come into existence. The younger generations are generally more supportive of multiculturalism, human rights, gender equality and environmental protection. The Greens and other progressive parties have gained more popularity. As a reaction to this, populist parties protecting the traditional norms and values of the country are becoming more popular among the older generation, white men, and less educated sectors (Inglehart & Norris, 2016).

The history of the United Kingdom and the European Union in combination with the theories of Inglehart and Norris explain the Brexit-vote from a more macroeconomic view. History shows that the European Union has never been really popular in the United Kingdom, and the economic inequality perspective and cultural backlash theory explain why this has become worse over the last years. This thesis will investigate from a more microeconomic view why individuals voted Brexit. What factors determine whether someone is more likely to vote to leave and what are the reasons these factors are of influence? The outcome of this thesis can be used to assess all assumptions that are made on the people who are responsible for the Brexit-vote. It will explain why individual citizens of the United Kingdom voted to leave the European Union. Also, the reasoning behind the relevant factors can be used to make predictions on which other countries are more likely to leave.

The main research question of this thesis will be:

What are the determinants of an individual Brexit-voter?

This thesis will investigate the significant determinants of Brexit-voters. Based on a literature research on factors influencing attitude towards the European Union, hypotheses on relevant determinants will be formulated. These hypotheses will be tested using a logistic method of regression on data of the British Election study. The methods, as well as the data, will be thoroughly explained. Thereafter, the results generated by the logistic regression will be presented and connected to the hypotheses. Finally, the research will be concluded, the limitations of the research will be discussed, and proposals for further research will be made.

2. Literature review

The determinants of a citizen's view towards the European Union have been investigated since the start of the Union in 1957. It is a topic with ongoing societal relevance. A stable democratic political system needs participation of its citizens. The citizens are the only legitimate source of power, as they represent the authority in a democracy (Kritzinger, 2003). Research states that for citizens to participate in politics, citizens need to have a positive attitude towards the political system. Negative attitudes towards the system lead to estrangement of the system, which damages the effectiveness and legitimacy of the democratic system (Hooghe & Marien, 2013). The European Union is a democratic system and to function in good order, it is thus necessary that its citizens participate and have trust in the organisation. In the beginning, research on the view of citizens on the European was done to investigate whether citizens wanted further European integration or not. Nowadays, research on public opinion towards the European Union is done to investigate how Eurosceptical countries are and which countries bear the greatest risk of leaving. A lot of interesting theories have been assessed over the years. This chapter will provide an overview of the most important theories to estimate public opinion and based on this, hypotheses will be formed.

2.1 Utilitarianism

Utilitarianism is a concept stating that actions should be judged based on its effect in promoting happiness, the surplus of pleasure over pain. In economics, the term happiness is often replaced by utility. The best decisions according to this theory are the ones maximizing utility (Posner, 1979). Utilitarianism has influenced many theories in economics, politics and law. The economic cost-benefit approach can also be traced back to utilitarianism. The cost-benefit approach state that individuals make their decisions by measuring costs and benefits of certain options (Frank & Cartwright, 2013).

Utilitarianism also influenced theories on what determined a citizen's view towards the European Union. Theories were developed around the assumption that individuals rationally pursue their own interests. Individual citizens support or oppose the European Union, because they have benefited from it or have been harmed by it (Guerra & McLaren, 2016).

The idea that a citizen actually calculates the costs and the benefits of its country being a member of the European Union may not sound reasonable. Indeed, behaviour often differs from the predictions of economic models. However, even if the cost-benefit approach is not perfect in predicting how citizens will behave, it will be a useful guidance to predict decisions (Frank & Cartwright, 2013).

There are two types of economic benefits regarding support for the European Union; direct and indirect benefits. Direct benefits refer to payments made by the European Union to a member state or an individual. Indirect benefits are benefits connected to membership of the European Union (Anderson & Shawn Reichert, 1995).

Research shows that individuals from countries that have benefited from the European Union are more supportive towards the European Union. Countries can benefit from their membership of the European Union directly by receiving payments or indirectly by the ease of trading with other member states. The United Kingdom, as a net contributor to the European Union Budget, contains the smallest percentage of citizens claiming that their country's EU membership is good (Guerra & McLaren, 2016).

Citizens can also benefit from the European Union individually. Individuals with certain socio-economic backgrounds are doing much better than individuals with other backgrounds because of European integration (Guerra & McLaren, 2016). For example, individuals who have a higher education generally do better in the European market. They seem to be more mobile and can therefore be more flexibly employed (Anderson & Shawn Reichert, 1995). Empirical research finds a significant result indicating that education is positively correlated with support towards the European Union (Gabel & Palmer, 1995) (Gabel, 1998) (Carey, 2002) (Lubbers & Scheepers, 2010) (Boomgaarden, Schuck, Elenbaas, & Vreese, 2011) (Goodwin & Heath, 2016).

Another positive correlation found in research, is that citizens with a higher income are more positive towards the European Union (Gabel & Palmer, 1995) (Gabel, 1998) (Carey, 2002) (Lubbers & Scheepers, 2010) (Boomgaarden, Schuck, Elenbaas, & Vreese, 2011). The reason for this is that these citizens profit from the free capital market and monetary union. It allows them to move capital across the EU and earn better interest rates (Guerra & McLaren, 2016). Furthermore, citizens with low incomes are generally more dependent on social welfare programmes and the European Union limits this budget (Gabel & Palmer, 1995). Almost all research supports the hypothesis that people with lower income are less favourable towards the European Union. However, the studies do not prove that a lack of positive attitudes results in a negative attitude. The losers of European integration tend to be neutral about this and thus a lower education and income do not necessarily mean that someone would vote to leave the European Union.

Lastly, individuals who live close to the border of another member state benefit more directly from cross-border trade and are therefore expected to be more supportive of the European Union (McLaren, 2002).

Four possible factors of influence on the determinants of a Brexit-voter follow from the utilitarian theory, namely benefits to the country of the citizen, education of the citizen, income of the citizen, and how close a citizen lives to the border.

Benefits to the country of a citizen is an important factor when analyzing differences in support between citizens of different countries. As this thesis does not perform a cross-cultural investigation, and the data contains United Kingdom citizens only, no hypothesis will follow from these benefits.

High education and income have proven to be determinants for support for the European Union in literature. This thesis will investigate if low education and income are determinants of a Brexit-voter. Literature states that low education and income make a citizen less supportive, but will it also make a citizen really vote to leave?

The sample of the British Election Study only contains citizens from England, Scotland and Wales, meaning citizens of Northern Ireland are excluded. The part of the United Kingdom that is studied is an island with no direct borders to other member states. The factor of living close to the border is therefore not included in this investigation.

This thesis will try to prove whether a correlation exists between low education or income and the Brexit-vote. The following two hypotheses are formed based on the utilitarian theory:

H1: Citizens with a low level of education are more likely to vote in favour of Brexit

H2: Citizens with a lower income are more likely to vote in favour of Brexit

2.2 Age

Age is said to be the most important factor that has influenced the Brexit-vote. Tables of the Brexit vote split up by age group indeed seem to show a relation between age and the vote to leave. Younger people notably voted to remain more and older people notably voted to leave more (Goodwin & Heath, 2016) (Curtice, 2017). It is remarkably that age seems to be so important in determining the outcome of the referendum, as in earlier research on European Union attitudes, age was often just a control variable. Age was often found not significant, or significant with a small negative correlation between age and positive European Union attitude (Anderson & Shawn Reichert, 1995) (Carey, 2002) (McLaren, 2002) (Kritzing, 2003). However, age has become an increasingly important predictor of attitudes towards the European Union. In Western and Northern Europe, younger people tend to have more liberal and internationalist views, making them more supportive of the European Union (Gaston & Harrison-Evans, 2017). Later research does find age an important significant factor of influence. Older people are more likely to be Eurosceptical (Lubbers & Scheepers, 2010), (Colonescu & Tanasoiu, 2008) (Kaufman, 2016). The elderly voting to leave the European Union is in line with the cultural backlash theory discussed in the introduction.

Older people hold traditional values most strongly. The younger population gradually replaces the older generation, and with them also the traditional values. The Greens and other progressive parties, supportive of multiculturalism, human, rights, gender equality and environmental protection gain more popularity. Older people feel like everything used to be better and their opposition towards the European Union is a reaction on the changes that take place in society. Older people oppose the European Union, as they feel that the European Union is contributing to changes (Inglehart & Norris, 2016).

In line with recent research, this thesis anticipates age to be negatively correlated with European Union support. The third hypothesis will thus be:

H3: Older people are more likely to vote in favour of Brexit.

2.3 Knowledge about politics and the European Union

For a citizen to make assumptions about the costs and the benefits of its country's membership of the European Union, a great deal of knowledge about the European Union and the economy is necessary. Studies show that citizens do not have that kind of knowledge, and are therefore not capable of estimating the costs and the benefits (Anderson, 1998). This assumption is the basis for the cognitive mobilisation theory and the theory of proxies to national government.

Higher levels of cognitive mobilisation seem to be positively related to support for the European Union (Anderson, 1998) (McLaren, 2002). People that are more cognitively mobilized discuss and think about politics more often, allowing them to process complicated political events better. People that are not cognitively mobilized are not likely to have gained a lot of information about the European Union and are therefore afraid of the unknown nature of the European Union (McLaren, 2007). The more people become familiar with the European Union, the less fearful and more supportive they become of it. Evidence indeed supports that people who talk about politics with friends and family have a more favourable attitude towards the European Union. Furthermore, a knowledge test about the institutions and history of the European Union was done. The persons that were capable of successfully completing the test were more supportive of the European Union (Guerra & McLaren, 2016).

The third hypothesis that will be tested, is the following;

H4: Citizens with less knowledge about politics are more likely to vote in favour of Brexit.

Citizens lack information about the European Union. This lack of information could make them less supportive towards the European Union, but it could also mean that citizens use proxies in evaluating the European Union. Many researchers argue that citizens often view the European Union in terms of their national government. (Guerra & McLaren, 2016) (Boomgaarden, Schuck, Elenbaas, & Vreese, 2011). This means that the Brexit-vote could have been a result of the unpopularity of the British government. Even outside the context of elections and referenda, feelings about the national government influence general feelings about the European Union. Citizens do not know enough about the European Union to form an opinion about it and therefore use information regarding something they do know well. Citizens tend to know more about their national government, as this is a less remote organisation (Anderson, 1998).

Another explanation for using proxies to national government is that the national government of each member state is responsible for representation the country's position within the European Union. So, in a way national government determines how the European Union performs (Gabel, 1998).

A third alternative explaining support for the European Union being in line with support for national government is that citizens in general are favourable or skeptical towards government institutions (McLaren, 2007).

There is also research arguing the opposite, namely that when national government is functioning well, there is no corruption, a strong rule of law and a well-developed welfare state, citizens are less positive about the European Union. Citizens may think there is no need for an additional government, as their own government is already functioning well. People with a less functioning government tend to be more positive towards the European Union. They think the European Union can compensate for the deficits of their own government (Guerra & McLaren, 2016). Evidence from Bulgaria supports the latter claim. Bulgarian citizens who are dissatisfied with their own governments' performance tend to be more supportive of the European Union (Colonescu & Tanasoiu, 2008).

One of the main arguments for Brexit was that the European Union was taking too much control. The people from the United Kingdom think they will do better by making their own rules and laws. This could implicitly state that people from the United Kingdom are positive about their own national government, and thus feel like they do not need an additional government. The fourth hypothesis will be:

H5: Citizens that are more supportive of their national government are more likely to vote in favour of Brexit.

2.4 Perceived national threat

Research shows that many citizens view the European Union as a threat to their national identity (Boomgaarden & Vreese, 2005). The theory behind this is called the social identity theory. People use group identity and protectiveness to simplify and understand the world or to support their self-esteem. Citizens may perceive the European Union as a potential threat to the identity that they formed for either of these purposes (Guerra & McLaren, 2016).

National identity is a very important factor in explaining attitudes of citizens towards the European Union (Carey, 2002). National identity can be interpreted as the nation's sovereignty or the cultural identity. The European Union can be a threat to both.

The European Union is not just an institution that supports free trade and free movement of citizens within Europe. It is an institution that makes policies and laws (McLaren, 2002). It has thereby taken on responsibilities and powers that some people will regard as preserved for the individual state (Curtice, 2017). The European Union taking on power from the nation-states, causes many citizens to see the European Union as a threat to their country's sovereignty. Citizens that consider the European Union as a threat to the nation-state are more likely to oppose European Union membership. Empirical research indeed proves that opposition towards the European Union is higher among citizens with a strong sense of national identity (Carey, 2002) (Curtice & Evans, 2017). However, not all research confirms this. The research of Boomgaarden, Schuck, Elenbaas and Vreese (2011) found, opposed to their expectations, a positive effect of national identity on citizen's attitude towards the European Union.

Citizens do not only fear the European Union as a threat to their country's sovereignty, but also as a threat to their country's cultural identity. Hostility towards other cultures has proven to be an important factor in explaining a citizen's attitude towards the European Union (Boomgaarden & Vreese, 2005) (Boomgaarden, Schuck, Elenbaas, & Vreese, 2011) (Curtice, 2017). The ideas, customs and social behaviour of a country's citizens determine its culture. These make each country's culture unique. Citizens who experience a cultural threat attach great value to the uniqueness of its country's culture. When more people with a different culture come, and live in their country, they fear that their culture is threatened. Immigrants, even though they are minority groups, can influence the country's culture (McLaren, 2002). Besides that, immigrants make use of public services at the cost of public services that their own group can use (Inglehart & Norris, 2016). The European Union and its open borders contribute to immigration. This thesis assumes that citizens who think that the

culture and resources of their nation are threatened by immigration in general, capture the same group of citizens that perceive a threat from European Union citizens immigrating. The same assumption is made in the research of McLaren (2002). Thus, this thesis expects citizens with a negative attitude towards immigration to have a more negative attitude towards the European Union.

Two hypotheses follow from the perceived national threat some citizens experience:

H6: Citizens with a strong feeling of national identity are more likely to vote in favour of Brexit.

H7: Citizens that have a negative attitude towards immigration are more likely to vote in favour of Brexit.

Kaufman (2016) claims there is a strong correlation between support for the death penalty and the Brexit-vote. This correlation can be explained by a citizen's personality. Many citizens see the world as a dangerous place and want to protect themselves from it. Those citizens attach great value to keeping the nation safe. The death penalty can be considered a means to keep dangerous people out of the world (Kaufman, 2016). This argument is similar to the argument on national identity. Only now, the nation's safety and not its sovereignty nor its cultural identity is protected. These strong feelings of needing to protect the nation coincide with Euroscepticism. The last hypothesis that will be tested is the following:

H8: Citizens that support the death penalty are more likely to vote in favour of Brexit.

2.5 Personality

Personality is an important factor when considering someone's political attitude. The Big Five model of personality of Goldberg is often used to assess behaviour and choices. This model contains the core characteristics that define attitudes and behaviour. These core characteristics tend to determine the surface characteristics, which are more adaptable to cultural and social influences. Bakker and Vreese (2015) researched why citizens differ in their attitudes towards the European Union by using the Big Five model on personalities. They analysed the influence of openness to experience, conscientiousness, extraversion, agreeableness and neuroticism on European Union attitudes. Based on a national survey conducted in the Netherlands, they found that only neuroticism is significantly correlated with attitude towards the European Union. A positive correlation between neuroticism and a negative attitude towards the European Union was found. Neurotic citizens are likely to experience fear, anxiety, anger and depression. Neurotic persons tend to experience negative feelings. The influence of neuroticism was found relatively small compared to other factors in the model, such as national identity, government approval and economic outlook

(Bakker & Vreese, 2015). Because of its relatively small influence, neuroticism will only be included in the model as a control variable. The other personalities will not be included as the research of Bakker and Vreese did not find a relation between them and a negative attitude towards the European Union.

2.6 Gender

Empirical research is inconclusive about the influence of gender on attitude towards the European Union. Gender is sometimes found to be insignificant (Gaston & Harrison-Evans, 2017) (Anderson & Shawn Reichert, 1995). Sometimes men seem to be more supportive towards the European Union (Carey, 2002) and sometimes women seem to be more supportive towards the European Union (Boomgaarden & Vreese, 2005) (Colonescu & Tanasoiu, 2008) (Boomgaarden, Schuck, Elenbaas, & Vreese, 2011). The size of the effect differs per study.

An explanation for men to be more supportive is that women are among the losers of the European integration, because of their weaker position on the labour market. Studies show that women are more vulnerable to economic integration (Carey, 2002). The income inequality theory of Inglehart and Norris (2016) states that the losers of the European integration are more likely to oppose the European Union.

On the other hand, Inglehart and Norris themselves do not consider women the losers of European integration and state that men are more likely to oppose the European Union. Men hold more traditional values about fixed sex roles. The fixed sex roles have been gradually replaced by progressive ideas about gender equality and interchangeable sex roles in the home and workplace. Via the cultural backlash theory, one could argue that men are thus more likely to vote in favour of Brexit (Inglehart & Norris, 2016).

Nowadays, women are not considered the losers of globalisation. This thesis therefore anticipates on a small significant positive correlation between men and the Brexit-vote. Gender will be added as a control variable, as its influence is expected to be relatively small.

3. Data and methodology

3.1 Data

The data used is retrieved from the British Election Study, which is the longest running social science survey in the United Kingdom. The British Election Study has been taking surveys after every general election since 1964. The study observes why people vote and why they vote the way they do. The study mainly focusses on socio-demographic characteristics and political values. The British Election survey is objective and independent, which makes their data of high quality.

The European Union Referendum, being one of the most important elections in British history, is a topic that is questioned in the surveys. The data that will be used in this thesis originates from the panel data on thirteen questionnaires, which were conducted between February 2014 and June 2017. A total of 68625 persons from England, Scotland and Wales filled in these questionnaires. Persons from Northern-Ireland are not in the panel data. All data is weighted for a general population of the United Kingdom

This research does not use all 68625 persons that filled in the questionnaires. The reason for this is that not all persons filled in the questions regarding the hypotheses that are tested in this thesis. After deleting all persons with missing observations, 14821 persons are left. Of these 14821 persons, 7249 persons voted to leave the European Union, 7493 persons voted to stay in the European Union, and 79 persons filled in 'Don't know'. The reason a big part of the sample is lost after deleting all persons with missing variables, is that not all persons filled in all thirteen questionnaires. This thesis focusses on questions in questionnaire 6, 7, 8, 9, and 10, which explains why for example all persons that just filled in questionnaire 1 are removed from the sample.

In appendix 1 and 2, a table with the mean, standard error, and amount of observations of the full sample and the sample after deleting the missing values is displayed. Table 1 shows a t-test on the difference between the mean of all variables before and after deleting the missing variables.

Table 1: t-test on difference in means between full sample and sample after deleting missing values

VARIABLE	MEAN FULL SAMPLE	MEAN AFTER DELETING MISSING VALUES	T-TEST VALUE	P-VALUE
REFERENDUM VOTE	0.5066199	0.4997638	1.3207	0.1866
LEVEL OF EDUCATION	3.058638	3.065785	-0.5575	0.5772

HOUSEHOLD INCOME	9.515818	9.186357	6.4423	0.000***
AGE	46.6191	53.95621	-48.4866	0.000***
POLITICAL ATTENTION	7.080085	7.238108	-6.9780	0.000***
APPROVE OF UK GOVERNMENT	2.666201	2.582214	6.7265	0.000***
BRITISHNESS	5.509089	5.463329	2.6635	0.0077***
IMMIGRATION LEVEL	2.211921	2.10249	5.6789	0.000***
DEATHPENALTY SUPPORT	3.225657	3.203023	1.4576	0.1449
NEUROTICISM	3.719528	3.644558	3.7022	0.000***
GENDER	1.537326	1.485055	12.5316	0.000***

* significant at 90% significance level

** significant at 95% significance level

*** significant at 99% significance level

The means for the different variables of the two samples do not economically differ. About the same proportion of persons voted to leave the European Union. Average household income and level of education also seem comparable for both samples. All other variables have an economically equal mean. The only notable difference is age. The people in the sample after deleting all observations with missing values are on average seven years older. If age turns out to be a determinant of the Brexit-vote, deleting the persons with missing values might bias the results.

However, statistically speaking the means of the two samples are not equal. They differ significantly for all variables, except for the referendum vote, level of education, and death penalty support.

Table 2 displays some descriptive statistics of the variables that are used in the analysis. The table describes subsequently the mean per variable of the full sample, the mean of the voters to leave the European Union and the mean of the voters to remain in the European Union. A t-test on the equality of the means will be performed in order to assess whether there is a visible difference between the two groups. In case the t-test is significant this can be seen as support for a variable being a determinant of how someone will vote.

Table 2: t-test on difference in means between Brexit-voters and non-Brexit voters

VARIABLE	MEAN FULL SAMPLE	MEAN PRO-BREXIT	MEAN AGAINST BREXIT	T-TEST VALUE	P-VALUE
LEVEL OF EDUCATION	3.065785	2.652366	3.461569	37.8978	0.000***

HOUSEHOLDINCOME	9.186357	8.86605	9.493001	7.0367	0.000***
AGE	53.95621	56.43537	51.58281	-20.8121	0.000***
POLITICAL ATTENTION	7.238108	7.143882	7.328315	5.1470	0.000***
APPROVE OF UK GOVERNMENT	2.582214	2.797351	2.376255	-21.4495	0.000***
BRITISHNESS	5.463329	5.812112	5.129424	-24.5797	0.000***
IMMIGRATION LEVEL	2.10249	1.550697	2.630745	53.6006	0.000***
DEATHPENALTY SUPPORT	3.203023	3.860808	2.573296	-53.1239	0.000***
NEUROTICISM	3.644558	3.607256	3.680269	2.0560	0.0398**
GENDER	1.485055	1.480066	1.489831	1.1890	0.2345

* significant at 90% significance level

** significant at 95% significance level

*** significant at 99% significance level

n= 14821

The table shows that the average level of education is significantly higher for the group of persons voting not voting Brexit. This supports the first hypothesis stating that lower educated persons are more likely to vote for Brexit. When comparing the means of the other variables, average household income, age, political attention, approve of the United Kingdom government, assessed Britishness, attitude towards immigration, and support for the death penalty, these are significantly different for Brexit-voters and non-Brexit-voters. The differences in the means are in line with the expectations from our hypotheses, and it seems as if these variables are determinants of individual Brexit-voters.

The means of the two groups also differ significantly for neuroticism, however an opposite effect from the expected effect is shown. The mean of persons not voting to leave the European Union is higher for neurotic persons This does not correspond with the hypothesis, stating that more neurotic persons are more likely to vote Brexit. Yet, the difference for neuroticism is economically speaking almost non-existing. The mean of gender does not differ significantly between Brexit-voters and non-Brexit-voters. This variable is therefore not expected to be a determinant of an individual Brexit-voter.

3.2 Methodology

As the dependent variable is a binary variable (only two outcomes, leave or not leave the European Union), the best way to test the hypotheses is to perform a logistic regression. The difference between an OLS regression and a logistic regression is that a logistic regression model does not predict the value of the dependent variable, but the probability of the dependent variable occurring based on the values of the independent variables.

The model can be expressed in the following way:

$$\ln\left(\frac{\text{prob}(\text{event})}{1-\text{prob}(\text{event})}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k.$$

The left-side of the equation is the natural logarithm of the odds of an event occurring. The odds are the probability an event occurs divided by the probability that the event does not occur. The event in our analysis is voting to leave the European Union and being a Brexit-voter.

$$\text{odds} = \frac{P(\text{Brexit-voter})}{1-P(\text{Brexit-voter})}.$$

The probability that someone votes to leave the European Union can be calculated as follows, with u being the $\ln\left(\frac{\text{prob}(\text{Brexit-voter})}{1-\text{prob}(\text{Brexit-voter})}\right)$.

$$p = \frac{1}{1 + e^{-u}}$$

This thesis will first perform a univariate logistic regression to see which variables play a role in determining someone's vote. The variables that are found significant will be included in a multivariate logistic regression in order to create a model that can predict someone's vote. The end goal is to create the most parsimonious model, the model with the most explanatory predictive power, using a minimum of predictor variables. Parsimonious models have just the number of predictors needed to explain the model well.

The most parsimonious model will be chosen by looking at different indicators. In a regular OLS model the R^2 -statistic is used to measure the goodness of fit of the model. The R^2 -statistic is the proportion of the variance in the dependent variable that is explained by the independent variables. The value of the R^2 -statistic ranges from 0 to 1, with values close to 0 indicating a weak fit and variables close to 1 indicating an excellent fit. A catch with the R^2 -statistic is that it always improves when a variable is added, without taking into account whether a variable is relevant or not. To defeat this problem, the adjusted R^2 is often used. This statistic penalizes a model for including too many variables. If a model contains variables that do not add sufficiently to the model the penalty will be high, the adjusted R^2 can therefore decrease after adding a variable, even if the R^2 increases slightly.

Comparable indicators exist for logistic regression, McFadden's pseudo R^2 and McFadden's pseudo adjusted R^2 . When two models based on the same dataset are compared, a model with a higher McFadden pseudo R^2 is a better model. The McFadden's pseudo R^2 -statistic is not expected to be as high as the OLS R^2 . Values of 0.2 to 0.4 are considered as a good fit

(McFadden, 1977), whereas if the OLS R^2 -statistic would take on these values this would be considered as a poor fit.

The Akaike's Information Criterion (AIC) and the Bayesian Information Criterion (BIC) can also be used to estimate the goodness of fit of a model. Both statistics give information on the relative quality of one model to another. Opposite to the R^2 -statistic, the model with the lowest AIC/ BIC is the best model. When comparing models, it is possible to increase the likelihood by adding variables, both the AIC and BIC give a penalty for adding too much variables. The penalties given are larger for the BIC than for the AIC.

The multivariate regression starts with a model that includes all variables that were found significant in the univariate regression and continues by deleting one variable in the next model. The variable that will be deleted will be the variable which removal has the least effect on the explanatory power of the model. This means that statistically insignificant variables will be removed first. The process of deleting one variable each time, will be repeated until no further variables can be removed without a statistically significant loss of fit. The loss of fit will be assessed based on the above-mentioned McFadden's pseudo R^2 , McFadden's pseudo adjusted R^2 , Akaike's Information Criterion, and Bayesian Information Criterion.

All regressions will be performed with Stata, considering a significance level of 95%.

3.3 Assumptions of logistic regression

Unlike OLS-regression, normality is not an assumption that needs to be fulfilled for a logistic regression. There are however other assumptions that this thesis will test and that are of importance to create a good logistic model.

3.3.1 Linearity

Logistic regression requires the independent continuous variables to be linearly related to the logit of the dependent variable (Field, 2009). The sample that is used contains several ordinal variables. These are categorical variables in an increasing or decreasing order. An example is the Likert scale, ranging from strongly disagree to strongly agree.

These variables can be included in the model either as continuous or categorical. Including ordinal variables as continuous variables requires certain assumptions to be fulfilled. The distance between each category should be equally spaced and the relation between the categories should be approximately linear. Including these variables as categories requires no assumptions and is therefore always a possibility. The downside is that the information in the ordering of the categories is lost when used as a categorical variable. Each category is then compared to the reference category.

3.3.2 Multicollinearity

Multicollinearity is not an assumption, but the presence of multicollinearity could be a problem when interpreting the results of a logistic regression (Field, 2009). Multicollinearity refers to a situation where some or all of the independent variables are highly correlated with each other. If this is the case, the model might provide a high pseudo R^2 , while the individual coefficients have high standard errors and can be insignificant.

Multicollinearity can be tested by constructing a correlation matrix of all independent variables and see if there are variables that are highly correlated. A correlation matrix of all variables used in the regression is presented in table 3. Correlations of 0.8 and above make that multicollinearity influences the model and that one or more coefficients are not estimated correctly (Field, 2009).

Table 3: correlation matrix

	LEVEL OF EDUCATION	HOUSEHOLD INCOME	AGE	POLITICAL ATTENTION	APPROVE OF UK GOVERNMENT	BRITISHNESS	IMMIGRATION LEVEL	DEATH PENALTY SUPPORT	NEUROTICISM
LEVEL OF EDUCATION	1.0000	0.1460	-0.2277	0.1782	-0.0600	-0.1199	0.2166	-0.3223	-0.0305
HOUSEHOLD INCOME	0.1460	1.0000	-0.0798	0.0265	0.0421	0.0085	0.0252	-0.0441	0.0425
AGE	-0.2277	-0.0798	1.0000	0.1170	0.0598	0.1689	-0.2395	0.0606	-0.1403
POLITICAL ATTENTION	0.1782	0.0265	0.1170	1.0000	-0.0898	-0.0325	-0.0829	-0.1897	-0.0727
APPROVE OF UK GOVERNMENT	-0.0600	-0.0421	0.0598	-0.0898	1.0000	0.2752	-0.1662	0.2199	-0.0594
BRITISHNESS	-0.1199	0.0085	0.1689	-0.0325	0.2752	1.0000	-0.1860	0.1620	-0.0666
IMMIGRATION LEVEL	0.2166	0.0252	-0.2395	-0.0829	-0.1662	-0.1860	1.0000	-0.2974	-0.0298
DEATH PENALTY SUPPORT	-0.3223	-0.0441	0.0606	-0.1897	0.2199	0.1620	-0.2974	1.0000	0.0149
NEUROTICISM	-0.0305	-0.0425	-0.1403	-0.0727	-0.0594	-0.0666	-0.0299	0.0149	1.0000

n= 14821

The highest correlation is the one between death penalty support and level of education, namely -0.3223. No correlations of 0.8 or higher are found in the sample, which means that multicollinearity will not affect the regression.

3.4 Variables

The variables used to form a model of determinants of a Brexit-voter will be discussed in this section. A distinction is made between the dependent variable and independent variables. Furthermore, the section will outline how each variable is added to the regression, as a continuous or categorical variable.

3.4.1 Dependent variable

European Union referendum vote

A logistic regression will be performed to establish a model that shows the determinants of a Brexit-voter. The dependent variable in the regression model is the categorical variable referendum vote. Participants of the British Election Survey had to answer in which way they voted at the 2016 referendum on membership of the European Union. With this information, a dummy variable is created taking on the value of 1 if a person chose to leave the European Union and a value of 0 if a person chose to remain in the European Union. 79 persons answered the question with 'don't know'. The answer of these persons was recoded into 0, because these persons cannot be considered as Brexit-voters.

3.4.2 Independent variables

Level of education

The first hypothesis states that lower educated people are more likely to vote in favour of Brexit. To assess this relationship, the categorical variable level of education is used. The participants could choose the highest level of education they had enjoyed out of the following options: 'no qualifications', 'below GCSE', GCSE, 'A-level', 'undergraduate' and 'postgrad'. The variable can be considered as ordinal, as it is ranked low to high with 0 being a person with no qualifications and 5 a postgrad. However, the spaces between each category cannot be considered as equal. In order to understand this, a bit more information on the British education system is needed. A General Certificate of Secondary Education (GCSE) is in fact a high school diploma. An A-level should be achieved when a person wants to pursue higher education, such as university. The step from 'no qualifications' to 'below GCSE' is obviously smaller than the step from 'below GCSE' to 'GCSE', and this is why level of education is included as a categorical variable.

The category 'no qualifications' is the reference category. The effect of having a particular level of education is investigated in comparison to a person with no qualifications.

Household income

The variable household income is used to test the relationship between income and the likelihood of someone voting to leave the European Union. The dataset of the British Election

Study contains fifteen options of income groups, as well as the option 'prefer not to answer' and 'don't know'. An option would be to remove the persons that filled in 'prefer not to answer' and 'don't know' from the sample and include household income as a continuous variable. This thesis chooses not to do this as the latter two account for respectively 2766 and 736 observations.

The different income groups are ranked from 1 to 15, indicating levels of income ranging from less than 5,000 Pounds to 150,000 Pounds and over. The fifteen categories are transformed into six categories: '0 to £19 999 per year', '£20 000 to £39 999 per year', '£40 000 to £69 999 per year', '£70 000 to £99 999 per year', '£100 000 to £149 999 per year', and '£150 000 and over'. Household income is thus included as a categorical variable, with 6 different options of income and the options 'prefer not to answer' and 'don't know'.

The category '0 to £19 999 per year' is the reference category. The effect of having a particular level of income is investigated in comparison to a person with an income under £20 000 per year.

Age

The third hypothesis tests whether older people are more likely to vote Brexit. The expectation is not that likeliness to vote Brexit increases with each year a person gets older. It is more likely that persons from a certain age are more likely to vote Brexit. Most people under the 50 voted to remain in the European Union (Dorling, 2016). Therefore, a dummy variable is created, taking on the value 1 if a person is 50 years or older and taking on the value 0 if a person is 49 or younger.

Political interest

An assumption made to assess the fourth hypothesis is that people that pay more attention to politics, have more knowledge about politics. The more people know about politics, the more they know of the European Union and the expectation is that they will therefore be more supportive of the European Union. The variable political attention is used in the regression. Participants of the British Election Study denoted on a scale from 0 to 10 how much attention they paid to politics, with 0 being no attention and 10 being a great deal of attention. They could also choose the option 'don't know'.

As not all participants will interpret the scale in the same way, the scale is divided into three parts: 0 to 3, 4 to 7 and 8 to 10. This divide stands for low attention, medium attention and high attention. The variable is included as a categorical variable, as the option 'don't know' will be preserved.

Support for national government

In order to test the relation between support for the government of the United Kingdom and likelihood to vote Brexit, the variable approve of United Kingdom government is added as an independent variable. Participants in the British Election Survey got the choice between 'strongly disapprove', 'disapprove', 'neither approve nor disapprove', 'approve' and 'strongly approve'. Approve of United Kingdom government is an ordinal variable. The options are given a number from 1 to 5, with 1 being strongly disapprove; and 5 being 'strongly approve'. As there is a ranking from negative to positive, the variable could be considered as a continuous variable. However, there are also 282 persons that chose the option 'don't know'. In order not to lose these persons, the variable will be included as categorical. Furthermore, the steps between the options cannot be considered equally, as the options will be perceived differently by every person.

The effect of increasing support for the United Kingdom government is investigated in comparison to a person that strongly disapproves the United Kingdom government.

Strong national identity

Persons with a strong national identity are expected to be more likely to vote Brexit as they see the European Union as a threat to their country's sovereignty. The variable 'Britishness' is used in the regression. Participants of the British Election Study denoted on a scale from 1 to 7 how British they feel, with 1 being not at all British and 7 being very strongly British. As not everyone assesses a scale in the same way, the scale was divided into three groups. Low Britishness was attached to the values 1 and 2, medium Britishness to the values 3, 4 and 5, and high Britishness to the values 6 and 7. Next to this, there is the category 'don't know'. If included, 'don't know' makes that the variable is not ordinal anymore. As 106 persons chose this option, the category will be included, and the variable will be regressed as a categorical variable.

The effect of feeling more British on the likelihood to vote to leave the European Union is investigated compared to someone feeling low values of Britishness as a reference category.

Attitude towards immigrants

The British Election Study asked its participants whether they thought the immigration level in the United Kingdom should be 'decreased a lot', 'decreased a little', 'left the same as it is now', 'increased a little' or 'increased a lot'. As there is a ranking from negative to positive, the possibility of adding the variable as continuous should be considered. However, 651 persons chose the option 'don't know', which makes it worthwhile to preserve don't know as a category and see if there is a significant effect on the referendum vote. The variable is

included as a categorical variable, because there is no equal distance between each possible option.

The category 'decreased a lot' is used as the reference category.

Support for death penalty

The variable 'DeathPenaltySupport' is used to assess the correlation between support for the death penalty and voting to leave the European Union. Participants of the British Election Study had to fill in whether they find the death penalty the most appropriate sentence for some crimes. Participants could fill in an answer ranging from 'strongly disagree', 'disagree', 'neither agree nor disagree', 'agree' to 'strongly agree'. As 'DeathPenaltySupport' is an ordinal variable, it could be included as a continuous variable. However, not everyone will assess the options the same, and therefore not every step can be seen as equally. Equal steps are necessary when including a variable as continuous. Furthermore, 574 persons filled in 'don't know' and to preserve these observations, the variable can only be included as categorical.

Neuroticism

Participants of the British Election Study self-assessed their neuroticism on a scale from 0 to 10. As there is a ranking from negative to positive, the variable is ordinal. The option 'don't know' is not given, and the variable will therefore be considered as continuous. The variable will test whether more neurotic people are more likely to vote Brexit.

Gender

Participants of the survey filled in their gender. Gender is a dummy variable, taking on the value 0 for male and 1 for female. The categorical variable 'Gender' is used in the regression.

4. Results

4.1 Univariate logistic regression

This section will display the results of the of the univariate logistic regressions. Referendum vote will be regressed on all independent variables that were discussed in the data section. Creating the following formula: $\ln(\text{Odds person votes leave/ person votes remain}) = \text{Constant} + X_i * B_i$. The coefficient (B_i), z-value and significance of the independent variables will be displayed in table 4 and the significant variables will be used for the multivariate logistic regression.

Table 4: univariate logistic regression of referendum vote on 10 different independent variables

REFERENDUM VOTE REGRESSED ON VARIABLE	COEFFICIENT	Z-VALUE	P-VALUE
LEVEL OF EDUCATION ('NO QUALIFICATIONS' AS REFERENCE CATEGORY)			
BELOW GCSE	-0.1324707	-1.19	0.233
GCSE A*-C	-0.3409678***	-4.45	0.000
A-LEVEL	-0.9253412***	-12.15	0.000
UNDERGRADUATE	-1.486392***	-20.71	0.000
POSTGRAD	-2.191097***	-24.31	0.000
HOUSEHOLD INCOME ('0 TO £19 999 PER YEAR')			
£20 000 TO £39 999 PER YEAR	-0.2417309***	-5.35	0.000
£40 000 TO £69 999 PER YEAR	-0.7710694***	-14.35	0.000
£70 000 TO £99 999 PER YEAR	-0.9662843***	-10.55	0.000
£100 000 TO £149 999 PER YEAR	-1.125368***	-7.38	0.000
£150 000 AND OVER	-0.92752***	-3.81	0.000
PREFER NOT TO ANSWER	-0.11452**	-2.227	0.023
DON'T KNOW	-0.4400831***	-5.44	0.000
AGE ('YOUNG' AS A REFERENCE CATEGORY)			
50 YEARS AND OLDER	0.5789523***	16.32	0.000
POLITICAL ATTENTION ('LOW' AS A REFERENCE CATEGORY)			
MEDIUM	-0.0535218	-0.80	0.421
HIGH	-0.1544655**	-2.36	0.018
DON'T KNOW	-0.9223096***	-3.53	0.000
APPROVE OF UK GOVERNMENT ('STRONGLY DISAPPROVE' AS A REFERENCE CATEGORY)			

DISAPPROVE	0.5572858***	11.51	0.000
NEITHER APPROVE NOR DISAPPROVE	1.165517***	22.97	0.000
APPROVE	1.095352***	21.12	0.000
STRONGLY APPROVE	0.9480372***	7.80	0.000
DON'T KNOW	0.4832678***	3.88	0.000
BRITISHNESS ('LOW' AS A REFERENCE CATEGORY)			
MEDIUM	-0.2501784***	3.78	0.000
HIGH	1.015584***	16.09	0.000
DON'T KNOW	-0.115466	-0.53	0.594
IMMIGRATION LEVEL ('DECREASED A LOT' AS A REFERENCE CATEGORY)			
DECREASED A LITTLE	-1.723027***	-36.43	0.000
LEFT THE SAME AS IT IS NOW	-3.0124225***	-52.10	0.000
INCREASED A LITTLE	-2.830134***	-23.38	0.000
INCREASED A LOT	-1.278861***	-12.77	0.000
DON'T KNOW	-2.165018***	-23.47	0.000
DEATH PENALTY SUPPORT ('STRONGLY DISAGREE' AS A REFERENCE CATEGORY)			
DISAGREE	0.9379876***	14.76	0.000
NEITHER AGREE NOR DISAGREE	1.628232***	24.68	0.000
AGREE	2.004634***	35.44	0.000
STRONGLY AGREE	2.730478***	45.89	0.000
DON'T KNOW	1.280077***	13.55	0.000
NEUROTICISM	-0.0156347**	-2.06	0.040
GENDER ('MALE' AS REFERENCE CATEGORY)			
FEMALE	-0.0390959	-1.19	0.234

* significant at 90% significance level

** significant at 95% significance level

*** significant at 99% significance level

n= 14821

The table shows the results of the regression of referendum vote on the level of education. The effect of having a certain level of education compared to having no qualifications is shown in the table. All levels of education seem to have a significant impact on the log likelihood that someone votes Brexit, except for the category 'below GCSE'. The reason 'below GCSE might not be significant is because there is in fact not much difference between someone with no qualifications and someone with an education level of below GCSE. The category 'below GCSE' does not differ significantly from the category 'no qualifications'. The other categories confirm the first hypothesis. A person with lower education is more likely to vote Brexit. With each level education increases, the log likelihood that someone votes Brexit decreases.

Referendum vote regressed on household income also shows a significant effect. The higher one's income, the less likely someone is to vote Brexit. This effect continues up until the category £100 000 to £149 999 per year. This confirms the second hypothesis, stating that citizens with a lower income are significantly more likely to vote in favour of Brexit. Persons that preferred not to answer the question on their household income and persons that filled in don't know as their household income are also significantly less likely to vote Brexit than a person with an income between 0 to £19 999 per year.

The table confirms the third hypothesis too. The chance that someone votes Brexit increases significantly when a citizen is fifty years or older.

The variable political attention is partly significant. The category medium attention is not significant, which means that there is no significant difference between a person with low and medium attention. The regression shows that someone with high political attention is less likely to vote for Brexit. This corresponds with the fourth hypotheses. However, the coefficient is relatively small, which means that there is not a big effect. The effect of a person that chose 'don't know' seems to be larger and is also significant.

Approve of United Kingdom government seems to be a significant variable. The regression shows that people that disapprove, neither approve nor disapprove, approve, and strongly approve are all significantly more likely to vote Brexit than someone that strongly disapproves. However, the effect seems to be the largest for people that neither approve nor disapprove, and therefore the hypothesis that someone that is more supportive of the British government is more likely to vote Brexit cannot be confirmed. The category 'don't know' is also significant and positive, meaning that someone who filled in don't know is more likely to vote Brexit than someone who strongly disapproves the United Kingdom government.

The people who feel medium Britishness are significantly less likely to vote Brexit than people that feel low Britishness. However, people that feel high levels of Britishness are significantly more likely to vote Brexit. The hypothesis that citizens with a strong feeling of national identity are more likely to vote for Brexit can therefore be confirmed. The category 'don't know' is not significant and will therefore not be interpreted.

Immigration level is found significant for all its categories. Compared to someone that feels like the immigration level should strongly decrease, all other categories are significantly less likely to vote Brexit. The results do not show that someone that wants the immigration level to strongly increase is least likely to vote Brexit. Citizens that want to leave the immigration

level as it is now are actually least likely to vote Brexit. The seventh hypothesis can however be confirmed as persons with the most negative attitude towards immigration are significantly more likely to vote Brexit. The category 'don't know' is also significant. Persons that filled in don't know are less likely to vote Brexit.

The more a person is supportive of the death penalty, the more likely this person is to vote Brexit. A significant, increasing effect is visible in the table. Persons that filled in don't know are more likely to vote Brexit than a person that strongly disagrees with the death penalty.

The more neurotic a person is, the less likely this person is to vote Brexit. The table shows a significant, negative effect of neuroticism on the Brexit vote. This does not confirm the expectation that neurotic persons are more negative towards the European Union.

Lastly, the control variable gender is found insignificant. The category 'female' does not differ significantly from the category 'male'.

The t-tests that were performed in the data section almost show the same results. The same variables showed a significant, expected effect. The variables that were found significant at a 95% are used in several multivariate regressions in order to find the most parsimonious model. The reason multivariate regressions are performed is in order to control for omitted variables. By adding more variables, eventual over- or underestimating of the effects of one of the variables can be corrected. Part of the effect that is shown in a univariate regression might be actually explained by a variable that is not included.

4.2 Multivariate logistic regression

In this section, a multivariate logistic regression will be performed. The dependent variable referendum vote is regressed on the independent variables. Creating the following formula: $\text{Ln}(\text{Odds person votes leave/ person votes remain}) = \text{Constant} + X1 * B1 + X2 * B2 + X3 * B3 + X4 * B4 + \dots$. Nine models were created, starting from a model with all variables with a 95% significance level from the univariate logistic regression, and continuing by removing one variable in the next model. When choosing the variable that will be removed, all variables are tested on the effect of their removal. The variables that have the smallest negative effect on the explanatory power of the model will be removed first. The decision is based on the McFadden's pseudo R^2 and the McFadden's adjusted pseudo R^2 .

4.2.1 The models

Model (1) contains all significant variables from the univariate logistic regression. Gender is therefore not taken into account anymore. Model (1) shows that the variable age, which was initially significant in the univariate regression has become insignificant in the multivariate logistic regression. The reason age has become insignificant is the perfect example of omitted variables. When just looking at age and the referendum vote, age seems to explain someone's vote. However, when more variables are added to model, the shown effect of age actually seems to be predicted by other variables. This thesis has tested if the addition of one particular variable would make age insignificant and found that this is not the case. There are multiple variables that take away significance of age. Part of it is explained by political attention, part of it by household income, etc.

In model (2) age is removed from the regression. All variables now show a significant effect. As the aim is to create the most parsimonious model, the variable that adds the least explanatory power to the model should be removed from the model next. This is tested by checking the decrease in explanatory power for each variable. When removing the variable neuroticism, the McFadden's pseudo R^2 does not change. As model (2) shows, the coefficient of this variable is relatively low. The effect on the vote is relatively small and its significance is not really high either. The variable neuroticism will therefore be removed secondly.

Model (3) contains only significant variables. Furthermore, the McFadden's pseudo R^2 and the McFadden's adjusted pseudo R^2 are still as high as in the first models. By removing the variable neuroticism, a more parsimonious model is created. The next variable that will be removed is someone's assessed Britishness, because the drop in explanatory power of the model is the smallest if Britishness is removed. As a consequence, the coefficients of approve of United Kingdom government become larger and more significant than before. From model (4), model (5) will be constructed by removing household income. As a consequence, the coefficients of education level become larger and more significant than before. This is a logical consequence as education level and household income are related. Someone with a higher education, in general will earn a higher income. The increase is however not really big, so the effect of level of education is not vitally overestimated.

From model (5), model (6) is constructed by removing the variable political attention. Still no big difference in the McFadden's pseudo R^2 and the McFadden's adjusted pseudo R^2 is seen. The next step is to remove the variable approve of United Kingdom government. A bigger drop in the explanatory power of the model is shown for model (7).

Next, level of education is removed in order to create model (8). Lastly, model (9) is created by removing death penalty support. The variable with most explanatory power is immigration level.

Table 5: models 1-5 of the backward elimination of the multivariate regression

VARIABLE	(1)	(2)	(3)	(4)	(5)
LEVELOFEDUCATION ('NO QUALIFICATIONS' AS REFERENCE CATEGORY)					
BELOW GCSE	-0.0011088 (-0.01)	--0.0009258 (-0.01)	--0.0035252 (-0.03)	--0.0038972 (0.03)	--0.0094882 (0.07)
GCSE A*-C	-0.2062144** (-2.33)	-0.2059806** (-2.33)	-0.2069105** (-2.34)	-0.2185336** (-2.48)	-0.531662*** (-2.88)
A-LEVEL	-0.4618723*** (-5.14)	-0.4614902*** (-5.18)	-0.4604812*** (-5.17)	-0.4809905*** (-5.41)	-0.5466112*** (-6.19)
UNDERGRADUATE	-0.7086358*** (-8.25)	-0.7082705*** (-8.32)	-0.70731*** (-8.31)	-0.7261483*** (-8.55)	-0.824408*** (-9.85)
POSTGRAD	-0.9874755*** (-9.01)	-0.9869873*** (-9.09)	-0.9859553*** (-9.08)	-1.013903 *** (-9.37)	-1.155667 *** (-10.87)
HOUSEHOLDINCOMEGROUPS ('0 TO £19 999 PER YEAR')					
£20 000 TO £39 999 PER YEAR	-0.1338631** (-2.35)	-0.133758 ** (-2.35)	-0.1283535 ** (-2.26)	-0.1339572 ** (-2.37)	
£40 000 TO £69 999 PER YEAR	-0.4825614*** (-7.06)	-0.4822983*** (-7.11)	-0.4737918*** (-7.0)	-0.4797572*** (-7.09)	
£70 000 TO £99 999 PER YEAR	-0.5209856*** (-4.51)	-0.5207112*** (-4.52)	-0.5081254*** (-4.42)	-0.479572*** (-4.50)	
£100 000 TO £149 999 PER YEAR	-0.530648*** (-2.9)	-0.5304559*** (-2.9)	-0.5155162*** (-2.82)	-0.5166611*** (-2.92)	
£150 000 AND OVER	-0.1168982 (-0.39)	-0.1166874 (-0.39)	-0.1021634 (-0.34)	-0.1192007 (-0.4)	
PREFER NOT TO ANSWER	-0.1494948** (-2.37)	-0.149493** (-2.37)	-0.1436803** (-2.28)	-0.1453347** (-2.31)	
DON'T KNOW	-0.0833624 (-0.82)	-0.0830646 (-0.82)	-0.0840687 (-0.83)	-0.0814889 (-0.81)	
AGE ('YOUNG' AS A REFERENCE CATEGORY)					
50 YEARS AND OLDER	-0.0014806 (-0.03)				
POLITICALATTENTION ('LOW' AS A REFERENCE CATEGORY')					
MEDIUM	0.3359158*** (4.22)	0.3357946*** (4.23)	0.3384564*** (4.26)	0.3384554*** (4.27)	0.3311719*** (4.18)

HIGH	0.6012946*** (7.41)	0.6010093*** (7.45)	0.608559*** (7.56)	0.6242403*** (7.76)	0.6040717*** (7.54)
DON'T KNOW	-0.2672481 (-0.87)	-0.26707 (-0.87)	-0.2689893 (-0.87)	-0.23201742 (-1.06)	-0.2943125 (-0.97)
APPROVE OF UK GOVERNMENT ('STRONGLY DISAPPROVE' AS A REFERENCE CATEGORY)					
DISAPPROVE	0.3826492*** (6.14)	0.3826528*** (6.14)	0.3852001*** (6.18)	0.4374655*** (7.12)	0.43188405*** (6.84)
NEITHER APPROVE NOR DISAPPROVE	0.7151665*** (10.87)	0.7151156*** (10.88)	0.7188188*** (10.94)	0.7971808*** (12.37)	0.7699446*** (12.02)
APPROVE	0.5575764*** (8.3)	0.5575472*** (8.3)	0.5650943*** (8.43)	0.6617527 *** (10.10)	0.6084575 *** (9.39)
STRONGLY APPROVE	0.2165441 (1.49)	0.2165403 (1.49)	0.2231633 (1.54)	0.3348026** (2.31)	0.2989711** (2.07)
DON'T KNOW	0.2341746 (1.54)	0.2343292 (1.54)	0.2329365 (1.53)	0.3164488** (2.1)	0.3066259** (2.03)
BRITISHNESS ('LOW' AS A REFERENCE CATEGORY)					
MEDIUM	0.1970187** (2.31)	0.1970007** (2.31)	0.1962991** (2.30)		
HIGH	0.4587172*** (5.56)	0.4585577*** (5.57)	0.4636889*** (5.64)		
DON'T KNOW	0.164554 (0.63)	0.1647812 (0.63)	0.1660961 (0.64)		
IMMIGRATION LEVEL ('DECREASED A LOT' AS A REFERENCE CATEGORY)					
DECREASED A LITTLE	-1.37474*** (-26.92)	-1.374661*** (-26.95)	-1.372462*** (-26.93)	-1.382270*** (-27.19)	-1.384652*** (-27.34)
LEFT THE SAME AS IT IS NOW	-2.268796*** (-36.06)	-2.268629*** (-36.18)	-2.264946*** (-36.15)	-2.311575*** (-37.10)	-2.319088*** (-37.38)
INCREASED A LITTLE	-1.982205*** (-15.22)	-1.981951*** (-15.24)	-1.981908*** (-15.24)	-2.047296*** (-15.84)	-2.054876*** (-15.95)
INCREASED A LOT	-0.8339807*** (-7.4)	-0.8337455*** (-7.42)	-0.8369514*** (-7.45)	-0.863867*** (-7.8)	-0.8594874*** (-7.74)
DON'T KNOW	-1.553207*** (-15.22)	-1.552921*** (-15.28)	-1.554534*** (-15.29)	-1.592922*** (-15.8)	-1.58025 *** (-15.73)
DEATHPENALTYSUPPORT ('STRONGLY DISAGREE' AS A REFERENCE CATEGORY)					
DISAGREE	0.5226104*** (7.2)	0.5225783*** (7.2)	0.5229574*** (7.2)	0.5274833*** (7.29)	0.5288965*** (7.33)
NEITHER AGREE NOR DISAGREE	0.9178236*** (12.01)	0.9178767*** (12.01)	0.91707*** (12.0)	0.922228*** (12.1)	0.9372658*** (12.35)

AGREE	1.028378*** (15.47)	1.028402*** (15.47)	1.029708*** (15.49)	1.041575*** (15.71)	1.046827*** (15.85)
STRONGLY AGREE	1.536777*** (22.08)	1.536842*** (22.09)	1.538385*** (22.11)	1.540877*** (22.22)	1.547184*** (22.4)
DON'T KNOW	0.8272759*** (7.32)	0.8274135*** (7.32)	0.8211873*** (7.27)	0.8230058*** (7.32)	0.8382489*** (7.48)
NEUROTICISM	-0.0194865** (-2.00)	-0.0194503** (-2.01)			
CONSTANT	-0.4054167*** (-2.61)	-0.4067596*** (-2.72)	-0.4954975*** (-3.47)	-0.1918819 (-1.52)	-0.2624512** (-2.13)
MCFADDEN'S PSEUDO R2	0.291	0.291	0.291	0.289	0.285
MCFADDEN'S ADJUSTED R2	0.288	0.288	0.288	0.286	0.283
AIC	14626.691	14624.692	14626.737	14675.053	14727.164
BIC	14900.428	14890.825	14885.266	14910.770	14909.656

* significant at 90% significance level

** significant at 95% significance level

*** significant at 99% significance level

n= 14821

Table 5: models 6-9 of the backward elimination of the multivariate regression

VARIABLE	(6)	(7)	(8)	(9)
LEVELOFEDUCATION ('NO QUALIFICATIONS' AS REFERENCE CATEGORY)				
BELOW GCSE	-0.002574 (-0.00)	--0.044459 (0.35)		
GCSE A*-C	-0.2130436** (-2.43)	-0.1954536** (-2.24)		
A-LEVEL	-0.491151*** (-5.57)	-0.4879852*** (-5.57)		
UNDERGRADUATE	-0.7425528*** (-8.9)	-0.7310569*** (-8.83)		
POSTGRAD	-1.042423 *** (-9.84)	-1.055699*** (-10.07)		
APPROVE OF UK GOVERNMENT ('STRONGLY DISAPPROVE' AS A REFERENCE CATEGORY)				
DISAPPROVE	0.3368578*** (5.44)			
NEITHER APPROVE NOR DISAPPROVE	0.6345804*** (9.81)			
APPROVE	0.5065282*** (7.66)			
STRONGLY APPROVE	0.2080993 (1.45)			

DON'T KNOW	0.0803858 (0.53)			
IMMIGRATION LEVEL ('DECREASED A LOT' AS A REFERENCE CATEGORY)				
DECREASED A LITTLE	-1.383331*** (-27.34)	-1.379061*** (-27.57)	-1.432849*** (28.94)	-1.723027*** (-36.43)
LEFT THE SAME AS IT IS NOW	-2.263665*** (-36.39)	-2.69864*** (-38.59)	-2.465121*** (-40.51)	-3.014225*** (-52.1)
INCREASED A LITTLE	-1.966383 *** (-15.19)	-2.141267 *** (-16.82)	-2.242596 *** (-17.83)	-2.830135*** (-23.38)
INCREASED A LOT	-0.8419794*** (-7.53)	-0.9969396*** (-9.18)	-1.017607*** (-9.55)	-1.278861*** (-12.77)
DON'T KNOW	-1.610621*** (-16.01)	-1.719646*** (-17.48)	-1.782264*** (-18.3)	-2.165018 *** (-23.47)
DEATHPENALTYSUPPORT ('STRONGLY DISAGREE' AS A REFERENCE CATEGORY)				
DISAGREE	0.4916951*** (6.82)	0.0710154*** (8.17)	0.6241108*** (8.89)	
NEITHER AGREE NOR DISAGREE	0.869458*** (11.53)	0.9910852*** (13.35)	1.113262*** (15.2)	
AGREE	0.9679091*** (14.77)	1.098964*** (17.12)	1.241128*** (19.7)	
STRONGLY AGREE	1.482192*** (21.6)	1.547137*** (22.84)	1.746401*** (26.46)	
DON'T KNOW	0.6970555 *** (6.31)	0.7298007*** (6.85)	0.8860043*** (8.34)	
CONSTANT	-0.0991577 (-0.73)	0.5631583*** (-6.02)	-0.021305 (-0.38)	-1.551823*** (-35.04)
MCFADDEN'S PSEUDO R2	0.281	0.274	0.264	0.224
MCFADDEN'S ADJUSTED R2	0.279	0.273	0.262	0.223
AIC	14800.130	14937.328	15149.076	15959.991
BIC	14959.810	15058.989	15232.718	16005.614

4.2.2 Choice of the model

The goal of this section is to choose the multivariate logistic that predicts someone's vote on the referendum best. This is done by choosing the most parsimonious model. The most parsimonious model will be chosen by looking at the number of variables each model contains and the McFadden's pseudo R^2 , McFadden's adjusted pseudo R^2 , Akaike's Information Criterion, and Bayesian Information Criterion.

Values of 0.2 to 0.4 are considered as a good fit (McFadden, 1977). All models have a McFadden's pseudo R^2 between 0.2 and 0.4, which means that the variables used in the models are a good fit for predicting the dependent variable.

Models (1), (2), and (3) have the same McFadden's pseudo R^2 and McFadden's adjusted pseudo R^2 . This means that model (3) can explain the same proportion of the variance in the dependent variable, however with less independent variables. If the most parsimonious model has to be chosen, model (1) and model (2) can be dropped.

The choice between model (3), (4), (5), (6), (7), (8), and (9) is left. When evaluating the McFadden's criteria, a notable drop in explaining power is found when going from model (6) to model (7), from model (7) to model (8), and from model (8) to model (9). The drop in explaining power between the other models is smaller. This can be considered evidence that the model should include at least the variables of model (6).

The choice is narrowed down to model (3), (4), (5), and (6) now. Based on the McFadden's pseudo R^2 , McFadden's adjusted pseudo R^2 , Akaike's Information Criterion, and Bayesian Information Criterion model (3) should be chosen, as it has the highest McFadden's R^2 and the lowest AIC and BIC. All variables and the constant are significant. Model (3) definitely is a good option. The question is however if there would be a statistically significant loss of fit if a variable is removed from this model. By removing the variable Britishness both the McFadden's statistics go down by just 0.02. The McFadden's adjusted pseudo R^2 , the AIC and the BIC all penalize a model when a variable that does not add sufficiently to the model is added. The fact that the McFadden's adjusted pseudo R^2 is higher for model (3), and the AIC and BIC are lower for model (3) means that it is relevant to leave Britishness in the model.

The model that will be chosen based on the information criteria is model (3).

4.2.3 Interpretation of the variables in the chosen model

In section 4.2.2 the model that can predict someone's vote in the referendum the best is found. Model (3) contains seven variables: level of education, household income, political attention, approve of the United Kingdom government, Britishness, immigration level and death penalty support. The variables age, neuroticism and gender are not considered determinants of a Brexit-voter as their coefficients were found insignificant. Hypothesis 3 on age must therefore be rejected. Underneath, all other hypotheses will be evaluated.

Level of education

The hypothesis belonging to this variable is the one stating that citizens with a lower education are significantly more likely to vote in favour of Brexit. The category 'below GCSE' is not significant. This might be caused because there is in fact little difference between a person with just a primary school diploma and a person with no qualifications. As the coefficient is not significant, it will not be interpreted.

All other categories show the effect of having a certain level of education compared to someone with no qualifications on the log likelihood that someone votes Brexit. As the categories are increasingly negative when level of education goes up, the hypothesis can be confirmed. A person with no qualifications has a higher log likelihood of voting Brexit than a person with a higher level of education. In fact, the higher someone's level of education is, the lower the log likelihood of this person voting Brexit. Hypothesis 1 is confirmed.

Household income

The second hypothesis states that citizens with a lower income are significantly more likely to vote in favour of Brexit. All categories, except for '£150 000 and over' and 'don't know', are significant. In appendix 3 a frequency table of household income is displayed. This table shows that our sample contains just 77 persons earning an income of £150 000 and over. This can be the reason that this category is insignificant, and not significantly different from the reference category. Also, the group of persons that filled in 'don't know' do not differ significantly from persons with an income from 0 to £19 999 per year.

The other categories confirm that if a person has a higher income, this person is less likely to vote Brexit. The coefficients become increasingly negative when a higher income group is considered. The second hypothesis can thus be confirmed, people belonging to lower income groups have a higher log likelihood to vote Brexit.

Lastly, there is the category 'prefer not to answer'. This category has a significant negative coefficient, which means that someone that filled in prefer not to answer is less likely to vote Brexit than someone with an income from 0 to £19 999 per year. Appendix 4 shows that most persons that filled in 'prefer not to answer' were undergraduates and thus higher educated. This is an explanation why this group is less likely to vote Brexit.

Political attention

The fourth hypothesis assumes that persons that pay more attention to politics know more of the European Union and are therefore less likely to vote for Brexit. Model (3) contradicts this, as the categories 'medium' and 'high' attention are increasingly positive. An opposite effect from the univariate regression is shown. This means that there were omitted variables included in the effect of political attention in the univariate regression.

The more attention someone claims to pay to politics, the higher the log likelihood of this person voting Brexit is. Hypothesis 4 must be rejected. The cognitive mobilization is not correct in this case. A remark on this finding must be made based on appendix 5, which shows that half of the sample states that they pay high political attention. Furthermore, 13 681 out of 14 821 persons state they either pay medium or high political attention. Reason could be that there was a lot of media attention around the referendum. It was continuously in the news. Furthermore, when such a big topic as leaving the European Union or not is going on, more people will pay attention. This question was asked right after the referendum and as a logical consequence a lot of persons would be stating they pay medium or high attention.

The category 'don't know' shows no significant effect and can therefore not be interpreted.

Approve of United Kingdom government

Hypothesis 5 states that persons that are more supportive of the United Kingdom government are more likely to vote for Brexit. Model (3) indeed shows that persons that disapprove, neither approve nor disapprove, and approve are more likely to vote Brexit than someone that strongly disapproves. However, the effect seems to be the largest for people that neither approve nor disapprove, and therefore the hypothesis that people who are more supportive someone of the British government, are more likely to vote Brexit must be rejected.

The categories strongly approve and don't know are not significant. This means that these categories do not differ significantly from the category strongly disapprove.

Britishness

The sixth hypothesis states that people that feel highly British are more likely to vote Brexit. The chosen model confirms this hypothesis. The more British a person feels, the higher the coefficient and thus the log likelihood that a person votes Brexit. Hypothesis 6 can be confirmed.

Lastly, the category 'don't know' is not significant. This category will therefore not be interpreted.

Immigration level

This thesis investigates whether citizens that have a more negative attitude towards immigration are significantly more likely to vote in favour of Brexit. The conclusion depends on what is considered as a negative attitude. This thesis will assume that someone has a negative attitude when someone thinks that the immigration level should be decreased a lot. This choice is made because it is a strong assumption to state that someone has a negative

attitude when someone thinks the immigration level should be decreased a little. The theory that backs up this hypothesis states that citizens who think that the culture and resources of their nation are threatened by immigration. If someone really feels threatened, it is more likely that this person would like to decrease the immigration level a lot.

All coefficients of the variable immigration level are showed in comparison to someone who wants to decrease immigration a lot. All other coefficients are negative, meaning that someone who thinks that immigration should decrease a lot have a higher log likelihood to vote Brexit than all other persons. All coefficients are also significant at a 95% significance level and the sixth hypothesis can therefore be confirmed.

A notable remark is that the persons who want to increase the immigration level a lot are more likely to vote Brexit than persons that want to decrease/ increase the immigration level a bit, and persons that want to leave the immigration level the same. This is not in line with expectations, as these persons should be least likely to be Brexit. However, as the hypothesis is just about people with a negative attitude, this has no effect on the conclusion taken.

Lastly, the category 'don't know' is also significant for immigration level. Person that filled in don't know are less likely to vote Brexit than persons that thought that immigration should be decreased a lot.

Death penalty support

Citizens that are in favour of the death penalty are significantly more likely to vote in favour of Brexit. The table shows that all coefficients are significant and increasing as a person's attitude becomes more positive towards the death penalty. A person's log likelihood to vote Brexit is 1.538385 higher when a citizen strongly agrees with the death penalty being an appropriate sentence for certain crimes than when someone strongly disagrees with this statement. This thesis considers the persons that agree and strongly agree as in favour of the death penalty. These two coefficients are the highest and these persons are therefore more likely to vote Brexit than other persons. The last hypothesis can be confirmed.

Furthermore, model (3) shows that persons that filled in 'don't know' are also significantly more likely to vote Brexit.

5. Conclusion, limitations and suggestions

5.1 Conclusion

This research explores the determinants of an individual Brexit-voter. The determinants of a citizen's view towards the European Union have been investigated since the start of the Union. Based on this earlier research, eight hypotheses on the determinants of a Brexit-voter are formed. These hypotheses are tested by performing univariate and multivariate logistic regressions. Based on the model that has been chosen, the following seven variables are found to be determinants of an individual Brexit-voter: level of education, household income, political attention, approve of the United Kingdom government, Britishness, immigration level and death penalty support. A hypothesis was connected to each of these determinants. Five out of seven of these hypotheses could be confirmed based on the model.

Utilitarian theories state that individual citizens base their support of the European Union on whether they have benefited from it or have been harmed by it. Citizens with lower education generally do worse in the European market, as they are less mobile and can therefore be less flexibly employed. For this reason, these citizens will benefit less from the European Union and they will therefore be more likely to vote Brexit. The chosen multiple logistic regression model confirms this hypothesis. Persons with lower education are more likely to vote Brexit.

The second hypothesis is also based on the utilitarian theory. Citizens with low incomes profit less from the free capital market. Furthermore, citizens with low incomes are generally more dependent on social welfare programmes and the European Union limits this budget. The chosen model confirms this hypothesis and shows a higher likelihood of a person voting Brexit when a person has a lower income.

The fourth hypothesis is based on the cognitive mobilisation theory. People that are not cognitively mobilized are not likely to have gained a lot of information about the European Union and are therefore afraid of the unknown nature of the European Union. The more people become familiar with the European Union, the less fearful and more supportive they become of it. An opposite effect is found in the chosen model. People that pay more attention to politics are more likely to vote Brexit. The fourth hypothesis is therefore rejected. A reason for this could be that the cognitive mobilisation theory is established in a different period. For persons living in the United Kingdom at the time of the referendum it was actually impossible to be unfamiliar with the European Union, as it was constantly in the news.

As for approval of the United Kingdom government, the literature offered two possible effects. Persons being negative towards the United Kingdom being more negative towards the European Union as a result of using proxies in evaluating the European Union, the national government being part of the European Union, and a general negative attitude towards government institutions. The hypothesis was however based on the assumption that Brexit-voters are positive about their own national government, and thus feel like they do not need an additional government. The literature did not confirm one of these options explicitly, nor does this thesis. The chosen model indeed shows that persons that disapprove, neither approve nor disapprove, and approve are more likely to vote Brexit than someone that strongly disapproves. However, the effect seems to be the largest for people that neither approve nor disapprove, and therefore the hypothesis that persons who are more supportive of the British government are more likely to vote Brexit must be rejected.

National identity can be interpreted as the nation's sovereignty or the cultural identity. The European Union can be a threat to both. Therefore, the sixth hypothesis states that people that feel highly British are more likely to vote Brexit. The chosen model confirms this hypothesis. The more British a person feels, the higher the coefficient and thus the log likelihood that a person votes Brexit.

A negative attitude towards immigration is also one of the determinants of the Brexit-voter that was found significant in the created model. When more people with a different culture come, and live in the United Kingdom, some people feel like their culture is threatened. Besides that, immigrants make use of public services at the cost of public services of the United Kingdom's original inhabitants. The European Union and its open borders contribute to immigration and can thus be seen as the cause of the threat.

The last hypothesis states that citizens that are supportive of the death penalty are more likely to vote Brexit. The explanation behind this correlation is that these citizens see the world as a dangerous place and want to protect themselves from it. Those citizens attach great value to keeping the nation safe. The death penalty can be considered a means to keep dangerous people out of the world. A significant positive correlation is found in the model between death penalty support and the log likelihood that a person votes Brexit.

The determinants of an individual Brexit-voter are thus: a low level of education, low household income, high political attention, neutral approval of the United Kingdom government, high Britishness, a negative attitude towards the immigration level and being supportive of the death penalty are determinants of a Brexit-voter.

The aim of this thesis was to develop a model for making predictions about a person's vote in the referendum. This was done based on the observed values of the independent values. The aim is to see if there is an effect/ relationship between a certain independent variable and a dependent variable. As the thesis does not perform an experiment no causal effects can be claimed. The results are thus descriptive.

For a lot of the variables 'don't know' is taken into account as a category. The final model shows that the category 'don't know' is not significant for most variables. From this can be concluded that a random group of persons chose for this option. For immigration level and death penalty support the category 'don't know' is significantly different from the categories 'strongly decrease' and 'strongly disapprove'. This means that the persons that want to strongly decrease immigration level and strongly disapprove of the death penalty are fundamentally different from the persons that chose for other options within each variable.

5.2 Limitations

The optimal goal of an empirical research is to establish a result that can be generalized to and across individuals, settings and times.

The sample that was taken of the population was large and random. This makes the sample representative of the population. There is however a threat to the external validity of the research, namely that the sample does not contain citizens of Northern-Ireland. In order to make valid assumptions about the determinants of a Brexit-voter, data on the inhabitants of Northern-Ireland should be added as these people also voted. The sample is not representative for the entire United Kingdom, as one of its countries is left out.

However, the results could be used to predict a vote in other European countries. Yet, other variables could come into play and interact with the effects of the determinants. Persons born in Spain will for example always be less likely to vote to leave the European Union than persons born in the United Kingdom. The reason for this will be an omitted variable that the chosen model is missing.

Another limitation of the research is that a lot of observations are lost when all persons that did not fill in all questions regarding the hypotheses are removed from the sample. Most variables have a significantly different mean before and after removing the persons with missing observations. Luckily, the differences are not economically different. The sample remains representative, and therefore the external validity is not affected much by this limitation.

A last remark on the conclusions taken is one regarding political attention. Appendix 5 shows that 13 681 out of 14 821 persons state they either pay medium or high political attention. The reason for this is that there probably was a lot of media attention around the European Union referendum. If the model that was created in this research is used in other countries to

predict if a person would want to leave the European Union, the coefficient of this variable will not be correct. When a random European Country is chosen and there is not going to be a referendum in the near future, the media attention will be much lower. Less people would pay political attention. More of the people that pay less attention are likely to vote to leave the European Union.

5.3 Suggestions

This research is relevant, as it contributes to research on how Eurosceptical countries are and which countries bear the greatest risk of leaving. The information retrieved from this thesis is specific for the United Kingdom. A suggestion for further research would therefore be to perform this study in other European countries. It is interesting to know whether the determinants of someone that is against the European Union are the same across Europe or differ per country. The United Kingdom is a relatively rich country. There could be different determinants in relatively poor countries. Approval of national government might have a different effect in relatively poor countries. As described in the theoretical framework, a negative attitude towards the national government might strongly increase the need for a European government. Effects could thus be opposite from the expectations for the United Kingdom.

A factor that was mentioned to be a determinant of Brexit in the news a lot, was the region someone is from. It would be interesting to investigate whether region is also a determinant. This suggestion can be supported by the utilitarian theory, as it relates to the statement that individuals from countries that have benefited from the European Union are more supportive towards the European Union. Persons living in regions that benefit less from the European Union membership would be expected to be less supportive of the European Union, and more likely to vote Brexit.

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Appendices

1. Mean, Standard Error, and amount of observations of full sample per variable

VARIABLE	MEAN FULL SAMPLE	SE FULL SAMPLE	N
REFERENDUM VOTE	0.5066199	0.0030492	28248
LEVEL OF EDUCATION	3.058638	0.0066149	39974
HOUSEHOLD INCOME	9.515818	0.0232597	57625
AGE	46.6191	0.0663401	66643
POLITICAL ATTENTION	7.080085	0.0128052	33502
APPROVE OF UK GOVERNMENT	2.666201	0.0072631	30036
BRITISHNESS	5.509089	0.009839	30036
IMMIGRATION LEVEL	2.211921	0.0080943	30148
DEATHPENALTY SUPPORT	3.225657	0.0080932	39857
NEUROTICISM	3.719528	0.0096045	51235
GENDER	1.537326	0.0019033	68625

2. Mean, Standard Error, and amount of observations of sample after deleting missing variables

VARIABLE	MEAN AFTER DELETING MISSING VARIABLES	SE AFTER DELETING MISSING VARIABLES	N
REFERENDUM VOTE	0.4997638	0.0041939	14821
LEVEL OF EDUCATION	3.065785	0.0111785	14821
HOUSEHOLD INCOME	9.186357	0.044611	14821
AGE	53.95621	0.1182396	14821
POLITICAL ATTENTION	7.238108	0.0179276	14821
APPROVE OF UK GOVERNMENT	2.582214	0.0099645	14821
BRITISHNESS	5.463329	0.0141637	14821
IMMIGRATION LEVEL	2.10249	0.0220054	14821
DEATHPENALTY SUPPORT	3.203023	0.0132181	14821

NEUROTICISM	3.644558	0.0177542	14821
GENDER	1.485055	0.0041054	14821

3. Household income frequency table

HOUSEHOLD INCOME	FREQUENCY
0 TO £19 999 PER YEAR	3660
£20 000 TO £39 999 PER YEAR	4304
£40 000 TO £69 999 PER YEAR	2407
£70 000 TO £99 999 PER YEAR	623
£100 000 TO £149 999 PER YEAR	217
£150 000 AND OVER	77
PREFER NOT TO ANSWER	2790
DON'T KNOW	743
TOTAL	14821

4. Household income split up by level of education

LEVEL OF EDUCATION → HOUSEHOLD INCOME ↓	NO QUALIFICATIONS	BELOW GCSE	GCSE	A-LEVEL	UNDERGRADUATE	POST GRAD
0 TO £19 999 PER YEAR	514	224	980	733	1012	197
£20 000 TO £39 999 PER YEAR	266	165	956	887	1671	359
£40 000 TO £69 999 PER YEAR	65	41	331	463	1126	381
£70 000 TO £99 999 PER YEAR	6	6	47	80	341	143
£100 000 TO £149 999 PER YEAR	1	0	10	25	110	71
£150 000 AND OVER	3	0	3	6	44	21

PREFER NOT TO ANSWER	244	135	551	524	1071	255
DON'T KNOW	55	23	149	151	287	78
TOTAL	1154	604	3027	2869	5662	1505

5. Frequency table of political attention

POLITICAL ATTENTION	FREQUENCY
LOW	1063
MEDIUM	6056
HIGH	7628
DON'T KNOW	74
TOTAL	14821